THE USING OF TWO LAYER MEMBRANES FOR THE EVACUATION OF HYDROGEN

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There are the pumping units on the base of non-evaporated getters for the vacuum evacuation of hydrogen. The main mechanism of the hydrogen pumping in such units is the absorption of hydrogen by non-evaporated getter. The working process of the pumps on the base of non-evaporated getters consists of two parts. The first one is the evacuation of hydrogen (absorption of hydrogen by non-evaporated getter). The second one is the regeneration of the non-evaporated getter (desorption of hydrogen by non-evaporated getter). The time of continuous pumping of hydrogen is determined by the absorption capacity of the getter. The using of permeable metal membrane enables us to evacuate the hydrogen in continuous mode without the time limits connected with the absorption capacity of getter. The problems of hydrogen evacuation by permeable membrane are described in works [1-4.]. We have considered diffusion model of hydrogen evacuation by metal membrane in the in work [5]. It was shown there are some problems of the using of permeable membrane for the hydrogen evacuation. It is connected with the limits of hydrogen diffusion in the membrane. The problem of the durability of the membrane may be solved be the using of two layer membranes [5]. Such membrane may be used in non-stationary mode. In this case the pulse of gas is absorbed by getter layer of the membrane. The absorbed hydrogen diffuses to the palladium layer and it is oxidized by oxygen on the palladium surface up to the water. The palladium tube with wall thickness 0.2 mm covered by the titanium non-evaporated getter with the thickness 1 mm was used as a membrane for the evacuation of hydrogen in pulsed mode. The results of the experiment are shown on Fig. 1. The results demonstrate the pumping speed of hydrogen in maximum equal to ~ 12 l/s. This result is more than that in stationary regime. One can use such intermittent regime of hydrogen pumping in the thermonuclear devices.

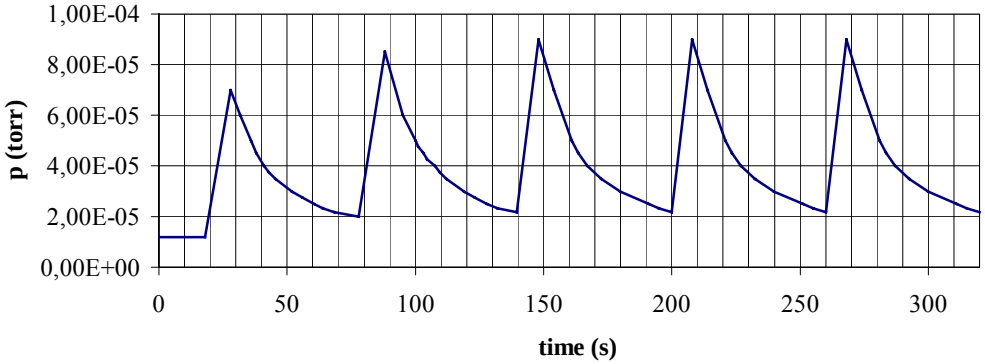

Fig.1 The dependence of pressure at the evacuation of hydrogen by two-layer membrane in intermittent regime on time.

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